

REMARKS*Status of Claims*

Claims 1, 2, 6, and 11 are pending, with claims 1 and 11 being independent.. Applicants provide herewith a declaration under 37 C.F.R. § 1.132 by Ryu OI, an expert in the field of ink technology, demonstrating that inks with R_{12} being an alkyl having 4 or more carbons have significantly superior light resistance properties compared to inks with R_{12} being a C_{1-3} alkyl. Also provided herewith is an Appendix including a Figure. The Figure illustrates how the inks of Naoto are made and the resulting ink and contrasts that with the inks of presently claimed invention. Applicants note that this Figure is provided to clarify our traversal of the rejection over Naoto, as requested by the Examiner.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the following remarks, the Figure in the Appendix, and the attached declaration.

Claim Rejections under 35 U.S.C. § 102

Claims 1-2 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP 11131000. Applicants respectfully maintain their traversal of this rejection.

The English translation of JP 11131000 (hereinafter “Naoto”) discloses an ink for inkjet recording. The inkjet ink of Naoto is made by dissolving coloring matter in an organic solvent and this *solution of coloring matter in organic solvent* is dropped into water containing a dispersant, creating an emulsion. (Paragraphs 0022, claim 1). The solubility of the organic solvent in water is less than 1% and the solubility of the coloring matter in the organic solvent is 3% or more. The organic solvent is removed from the emulsion creating an *inkjet ink comprising coloring matter dispersed in water* and a dispersant. Accordingly, the inkjet ink of Naoto is a coloring-matter dispersion ink. (Paragraph 0005). Naoto teaches that the inkjet ink contains a dispersant, for example polyvinyl alcohol, and may also contain moistening agents, such as ethylene glycol. (Paragraphs 0020 and 0021).

As noted above, in the Appendix following these remarks, Applicants have included a Figure illustrating how the inks of Naoto are made and the resulting ink.

In contrast, the presently claimed aqueous ink comprises water and a resin, wherein the resin is colored with a water-insoluble coloring matter. The water-insoluble coloring matter is selected from a group consisting of a specifically claimed class of quinophthalone compounds, a specifically claimed class of pyridine azo compounds, and mixtures thereof. The specification teaches that the resin of the aqueous ink can be a resin having an ionic group on the surface, including, for example, a polyester resin, a vinyl polymer, a styrenic resin, a styrene-acrylic copolymer, and a polyurethane resin. (page 39, 2nd paragraph). The specification further teaches that the ink may also contain various additives, including dispersants. (page 54, 3rd paragraph).

As provided in the specification (at, for example, page 52, lines 5 – 11) and as illustrated in the Figure, the presently claimed inkjet ink comprising water and a resin as an emulsion, wherein the resin is colored with a water-insoluble coloring matter, is made by the process detailed below. In the process of making the claimed inks, the coloring matter is dissolved in a water-insoluble organic solvent containing the resin, obtained by polymerization, to provide the resin colored with the coloring matter. The resin colored with the coloring matter in the water-insoluble organic solvent is then added to water to form a water dispersion and conduct emulsification. The water-insoluble organic solvent is then removed by distillation to provide the presently claimed ink comprising water and the resin as an emulsion, where in the resin is colored with the coloring matter. It is important to note that the resin is colored by the coloring matter.

Accordingly, Applicants respectfully assert that the presently claimed inks are significantly different from the inks of Naoto. The above-description and the Figure illustrates the significant differences between the presently claimed inks and the inks of Naoto. In particular, the Figure provides an illustration that contrasts how the presently claimed inks and the inks of Naoto are made and thus provides clarification of the significant differences.

To anticipate a claimed invention under §102, a reference must teach each and every element of the claimed invention. Applicants maintain that in no way does Naoto

teach or suggest an inkjet ink comprising water and a resin as an emulsion wherein the resin is colored with a water-insoluble coloring matter.

As set forth above and as illustrated in the Appendix, the inkjet ink of Naoto is made by dissolving coloring matter in an organic solvent and this *solution of coloring matter in organic solvent* is dropped into water containing a dispersant, creating an emulsion. (Paragraphs 0022, claim 1). The organic solvent is removed from the emulsion creating an *inkjet ink comprising coloring matter dispersed in water* and a dispersant. The polyvinyl alcohol of Naoto is a water soluble dispersant, ***surrounding*** the dispersed particles of the coloring matter. In contrast, as set forth above and as illustrated in the Appendix, in the presently claimed invention, the coloring matter is ***dissolved in*** a water insoluble resin, which is dispersed in water. Accordingly, the polyvinyl alcohol of Naoto is a dispersant not a water insoluble resin according to the presently claimed invention.

With regard to page 52, lines 5 – 11 of the present specification, Applicants submit that this provides a description of the process for making the inkjet ink comprising water and a resin as an emulsion, wherein the resin is colored with a water-insoluble coloring matter, as described in detail above and as illustrated in the Appendix. In summary, the presently claimed ink comprises resin particles colored by the coloring matter and the resin particles colored by the coloring matter are then dispersed in the water. In contrast in Naoto, as noted above, the polyvinyl alcohol of Naoto is a water soluble dispersant, ***surrounding*** the dispersed particles of the coloring matter, in the water.

As Naoto does not teach each and every element of the claims, it cannot anticipate the presently claimed invention. Accordingly, withdrawal of the rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claim Rejections under 35 U.S.C. § 103

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Leoffler (U.S. Patent No. 4,514,226). Applicants maintain their traversal of this rejection.

Leoffler relates to a class of monoazo pyridone compounds encompassing a vast number of compounds, which are used as colorants for coating compositions, organic solvents, and mineral oil products. The compounds of Leoffler have six generic substituents, which individually must be selected from separate lists of possible substituents. Two of these generic substituents are B and T, which are located on the pyridone ring. Leoffler defines substituent B as hydrogen or C₁-C₃ alkyl and substituent T as hydrogen, cyano, COR, or COR₄. Leoffler teaches that in preferred classes of compounds, B is methyl and T is cyano. In all of the compounds disclosed by Leoffler in which T is cyano, B is methyl.

In contrast, the compounds of claim 11 are pyridone azo compounds with a cyano substituent and a substituent R₁₂ (which corresponds to B of Leoffler) defined as a linear or branched alkyl group having 4 or more carbon atoms. The compound of claim 11 also has six other generic substituents to be selected from lists of possible substituents.

Applicants respectfully submit that Leoffler does not disclose, teach or suggest the presently claimed compounds of claim 11 with R₁₂ being a linear or branched alkyl group having 4 or more carbon atoms. All of the compounds that Leoffler teaches having a cyano on the pyridone ring have a methyl substituent. In fact, in all of the compounds specifically disclosed and claimed by Leoffler, T is cyano and B is methyl. Therefore, the compounds of Leoffler are significantly different than the presently claimed compounds.

In support thereof, Applicants provide herewith a declaration under 37 C.F.R. § 1.132 by Ryu OI, an expert in the field of ink technology, demonstrating that inks with R₁₂ being an alkyl having 4 or more carbons have significantly superior light resistance properties compared to inks with R₁₂ being a C₁₋₃ alkyl. Specifically, the declaration demonstrates that inks with R₁₂ being an alkyl having 4 or more carbons exhibit OD₂ values of 95-97%, while inks with R₁₂ being a C₁₋₃ alkyl exhibit OD₂ values of only 81-83%. Accordingly, the presently claimed inks do exhibit superior light resistance over Leoffler. Therefore, Applicants respectfully submit that Leoffler does not disclose or suggest the presently claimed aqueous ink for inkjet recording and pyridine azo compound.

In addition, the present specification provides comparative examples of compounds having a substituent R_{12} that is an alkyl group smaller than 4 carbon atoms. Compounds with a R_{12} being methyl, ethyl, and propyl were made and evaluated and often the identical compounds with R_{12} being a butyl were also made and evaluated. (See Tables 2 and 3). The results of the evaluation of inks made with compounds having a R_{12} being a C_{1-3} alkyl and compounds having a R_{12} substituent being an alkyl having 4 or more carbons demonstrate that the inks with R_{12} being a C_{1-3} alkyl are significantly inferior to those with R_{12} being an alkyl having 4 or more carbons. In particular, the results of the light resistance evaluation clearly provide that the inks with R_{12} being an alkyl having 4 or more carbons have significantly superior properties.

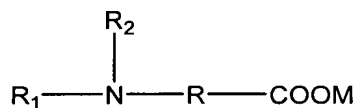
Accordingly, Applicants respectfully submit that the presently claimed pyridone azo compounds are significantly different than the compounds of Leoffler, and as such, Leoffler does not teach or suggest the presently claimed compounds.

Claims 1 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsutsumi (U.S. Patent No. 6,031,019) or Komatsu (U.S. Patent No. 6,379,443) either of which in view of Leoffler. Claims 1 and 2 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsutsumi or Komatsu either of which in view of Ohyama (U.S. Patent No. 5,359,075). Applicants respectfully disagree with these rejections; therefore, the rejections are traversed.

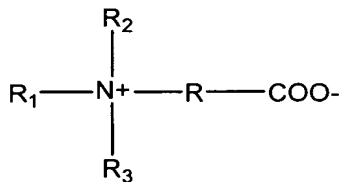
Tsutsumi relates to an aqueous ink for inkjet printing that contains at least one compound selected from the group consisting of compounds (a) to (d):

(a) an amino acid or salt thereof,

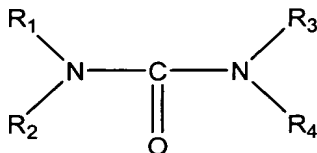
(b) a substantially water-soluble compound represented by formula (1)



(c) a substantially water-soluble compound represented by formula (2)

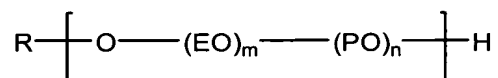


(d) a substantially water-soluble compound represented by formula (3)



Tsutsumi teaches that the amino compounds of (a) to (d) serve to impart moisture retention to the aqueous ink to secure ink dispersion stability and ejection properties. The inks of Tsutsumi also comprise a polymer emulsion. Tsutsumi teaches that the polymer emulsion can be an emulsion of fine polymer particles colored with a colorant. (Col. 3, lines 65-67). Tsutsumi teaches that the colorants to be used in the ink include dyes, such as oil-soluble dyes (oil colors), disperse dyes, direct dyes, acid dyes, and basic dyes, and pigments, all of which are commonly known to those of skill in the art.

Komatsu relates to an ink composition for printing on a heated recording medium. The ink compositions of Komatsu comprise a colorant, a water-soluble organic solvent, water, and at least one compound represented by the following formula (I):



The ink composition of Komatsu is formulated to print on a recording medium heated to a temperature of or above the cloud point of the compound of formula (I). The colorants of Komatsu can be a pigment directly included in the ink composition or a resin colored with dyes or pigments. Komatsu teaches a variety of organic and inorganic pigments and dyes, all of which are well-known to those of skill in the art.

As described above, Leoffler relates to a class of monoazo pyridone compounds encompassing a vast number of compounds, which are used as colorants for coating compositions, organic solvents, and mineral oil products. As explained above, all of the

compounds that Leoffler teaches having a cyano on the pyridone ring have a methyl substituent.

Ohyama relates to quinophthalone compounds suitable for coloring liquid crystal materials. Ohyama teaches that the quinophthalone compounds have a high solubility in a liquid crystal material and the liquid crystal material can be colored and dyed at a high concentration and maintain a sharp and transparent color tone. (Col. 5, line 63 – Col. 6, line 1).

In contrast to the above-cited documents, the presently claimed invention relates to an aqueous ink for inkjet recording comprising water and a resin, wherein the resin is colored by a water-insoluble coloring matter selected from specifically claimed compounds. The specification also teaches that the claimed aqueous ink comprising resin colored by the water-insoluble coloring matter selected from the specifically claimed compounds has excellent storage stability, fixability to the recording medium, vividness of recorded image, light resistance, and water resistance. (page 55, 1st paragraph and Table 3).

It is respectfully submitted that the inks of Tsutsumi and Komatsu are significantly different than the presently claimed inks. First, Applicants will address Tsutsumi and Leoffler or Ohyama. The inks of Tsutsumi comprise a polymer emulsion and at least one of the amine compounds of (a) to (d) to impart moisture retention to the aqueous ink to secure ink dispersion stability and ejection properties. The polymer emulsion of Tsutsumi is an emulsion of fine polymer particles impregnated with water-insoluble or sparingly water-soluble well-known colorants.

In contrast, the presently claimed aqueous inks comprise water and a resin as the main components wherein the resin is colored with coloring matter selected from specifically claimed compounds. The coloring matter is selected from a specifically claimed class of quinophthalone compounds or a specifically claimed class of pyridone azo compounds. The present specification discloses that inks comprising the claimed resins colored with the claimed class of quinophthalone compounds or pyridone azo compounds exhibit superior properties. It is respectfully submitted that there is not teaching or suggestion in Tsutsumi, which is related to amine compounds for imparting

moisture retention to an aqueous ink to secure ink dispersion stability and ejection properties, to utilize the specifically claimed coloring matter.

In addition, as explained above and as set forth in the attached declaration, Leoffler does not disclose, teach, or suggest the presently claimed class of pyridone azo compounds. Furthermore, Ohyama is related to colorants for liquid crystal materials. Ohyama teaches that the quinophthalone compounds have a high solubility in a liquid crystal material and the liquid crystal material can be colored and dyed at a high concentration and maintain a sharp and transparent color tone. There is no teaching or suggestion in Ohyama of using the quinophthalone compounds in an inkjet ink composition.

Accordingly, it is respectfully submitted that even if combined, Tsutsumi in view of Leoffler or Ohyama does not teach or suggest the presently claimed aqueous ink comprising water and a resin wherein the resin is colored by a certain class of quinophthalone compounds or a certain class of pyridone azo compounds.

With regard to Komatsu, the inks of Komatsu are also significantly different than the presently claimed inks. The inks of Komatsu comprise a water soluble organic solvent, water, a colorant, and an ethyleneoxy/propyleneoxy compound. The inks of Komatsu are specifically formulated to print on a recording medium heated to a temperature of or above the cloud point of the ethyleneoxy/propyleneoxy compound. The colorants of Komatsu can be any one of a long list of well-known pigments or a resin colored with well-known dyes or pigments.

In contrast, the presently claimed aqueous inks comprise water and a resin as the main components wherein the resin is colored with coloring matter selected from specifically claimed compounds. The coloring matter is selected from a specifically claimed class of quinophthalone compounds or a specifically claimed class of pyridone azo compounds. The present specification discloses that inks comprising the claimed resins colored with the claimed class of quinophthalone compounds or pyridone azo compounds exhibit superior properties. It is respectfully submitted that there is no teaching or suggestion in Komatsu, which is related to an ink composition suitable for

printing on a heated recording medium and thus containing certain ethyleneoxy/propyleneoxy compounds, to utilize the specifically claimed coloring matter.

In addition, as explained above and as set forth in the attached declaration, Leoffler does not disclose, teach, or suggest the claimed class of pyridone azo compounds. Furthermore, Ohyama is related to colorants for liquid crystal materials, and as such does not teach or suggest using the quinophthalone compounds in an inkjet ink composition.

Accordingly, it is respectfully submitted that even if combined Komatsu in view of Leoffler or Ohyama does not teach or suggest the presently claimed aqueous ink comprising water and a resin wherein the resin is colored by a certain class of quinophthalone compounds or a certain class of pyridone azo compounds.

Therefore, Applicants respectfully request withdrawal of the obviousness rejections.

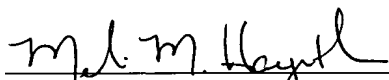
Conclusion

For the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present invention as defined by the claims.

In view of the foregoing remarks and attached declaration, reconsideration of the claims and allowance of the subject application is earnestly solicited. The Examiner is invited to contact the undersigned at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: 
Melissa M. Hayworth
Registration No. 45,774

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620
Date: December 11, 2003